AUGUST *2018 Update*

Macro Base Station Transceiver Update

Major changes to the forecast over the last three months include:

1. Mobile Experts has significantly boosted our estimate for 5G deployment below 6 GHz, starting with 200,000 base stations in 2019. Indications from China Mobile are strong that they will deploy extremely aggressively, starting in Jan-Feb 2019.

2. Verizon and AT&T have announced additional cities for 28 GHz 5G deployment, and field trials are showing better than expected range and penetration. We have increased our estimates throughout the five-year forecast for mm-wave infrastructure.

3. Deployment in the short term for T-Mobile USA has been listed as LTE deployment in 2018, with an anticipated software upgrade to 5G during 2019.

4. We've increased the number of estimated sectors for 5G per base station. We started with a baseline of 3 sectors per base station but now we're assuming about 3.4 RRH per gnodeB based on expected placement on existing sites.

5. We've re-constructed our method for tracking multi-band RRH units. We now track multi-band RRH with wideband PAs, separately from multi-band RRH that use two separate power amplifiers. The number of physical RRH units shown in Table 4-3 represents the number of physical boxes.

6. The transceiver shipments by power level have been updated to account for much large numbers of massive MIMO radios in the 2019-2021 timeframe. It's a dramatic increase on Table 6-2 in the number of radios below 5W.

7. The regional shipment analysis is heavily weighted to China in the 5G forecast for 2019-2021 but there is also 5G deployment in USA, a few European countries, Korea and Japan that will be meaningful with long term ongoing growth.

8. Market shares are crazy this quarter. ZTE was shut down for half of 2Q2018 due to a ban on semiconductor sales to the company by the US Department of Commerce. So we have set ZTE share much lower. The other vendor market shares jumped upward temporarily due to the ZTE shutdown…this is a transient effect and is not expected to last.